PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/532,275	Examiner: Christopher S. Bobish
Applicant/Appellant: Mark Christopher Hope	Art Unit: 3746
Title: IMPROVEMENTS IN DRY PUMPS	Confirmation No.: 8421
Filed: September 28, 2005	
Atty. Docket No.: M02B156	

Commissioner for Patents and Trademarks
MAIL STOP ****APPEAL BRIEF - PATENTS****
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir/Madam:

In response to the Notice of Panel Decision from Pre-Appeal Brief Review dated January 11, 2010, Appellant submits herewith an Appeal Brief in the above-referenced matter under 37 C.F.R. §41.37.

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I. STATEMENT OF THE REAL PARTY IN INTEREST

The real party in interest is Edwards Limited, an English corporation having its principal office and place of business at Manor Royal, Crawley, West Sussex, United Kingdom RH10 9LW. Edwards Limited is the assignee of record of the subject application.

II. RELATED APPEALS AND INTERFERENCES

Appellant is not aware of any related appeals, judicial proceedings or interferences that may be related to, directly affect, be directly affected by, or have a bearing on the Board's decision on this appeal.

III. STATUS OF CLAIMS

Claims 1-16, 18, 19, 23 and 24 are pending in the application, in which claims 1-5, 18, 19, 23 and 24 have been withdrawn. Claims 17 and 20-22 have been cancelled. Claim 15 is allowed. Claims 6-14 and 16 stand rejected by the Examiner, and are the claims on appeal.

IV. STATUS OF AMENDMENTS

No amendment has been filed subsequent to the Final Office Action (the "Office Action") dated July 16, 2009.

V. SUMMARY OF CLAIMED SUBJECT MATTER

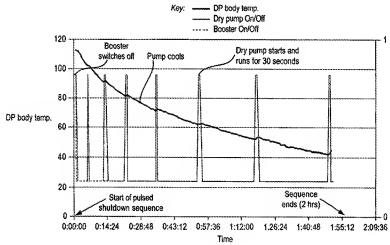
Dry pumps are often used in semiconductor manufacturing processes that produce particulate by-products. When a dry pump is in operation, it often runs continuously for hours and days at a temperature around 120°C. When the pump is switched off, it cools down to the normal room temperature around 19°C, causing the running clearances between the rotors and stators of the pump to reduce. The particulate by-products are compacted in between the contracted rotors and stators. As a result, a restart of pump may fail.

The claimed invention is directed to a method for clearing particulates from a dry pump after it ceases operation, thereby ensuring a successful restart of the pump later on. Exemplary independent claim 6 is directed to a method of reducing the incidence of restart failure in a dry pump. The method comprises a) detecting the cessation of operation of the pumping mechanism (*the specification on page 3 at line 6, and the "stop signal" in FIG. 3)*; b) monitoring the temperature of the pumping mechanism after cessation of operation *(the specification on page 7 at lines 17-22, and the bolded curve in FIG. 4)*; and c) at at least one pre-selected temperature interval, initiating operating of the pumping mechanism for a fixed time period so as to purge a proportion of contaminant particulate matter present *(the specification on page 7 at lines 1-13, and the pulses in FIG. 3)* until a predefined temperature is reached or a predefined time limit has passed *(the specification on page 7 at lines 13-15, and the last pulse in FIG. 4)*.

As an example shown in FIG. 4 reproduced below, the dry pump is turned on and off alternately until the temperature of the pump body reaches about 40°C. One of the benefits of the claimed invention is to evacuate contaminant from the pump as it cools so

that when it is cooled to the ambient temperature, there is significantly less particulate contaminant in the pumping mechanism than there would otherwise be. *See, the specification, page 2, lines 25-32.* This, in turn, provides a greater chance of success in restarting the pump.

Fig. 4



VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether Examiner errs in rejecting claims 6 and 16 under 35 USC 102(b) as being anticipated by US Patent No. 5,691,291 to Sakagami et al. (hereinafter referred to as "Sakagami")

B. Whether rejections to claims 7-14 under 35 USC 103(a) over Sakagami should be withdrawn, at least, for their dependence on claim 6.

VII. ARGUMENT

A. Examiner errs in rejecting claims 6 and 16 under 35 USC 102(b) as being anticipated by Sakagami.

1. Sakagami fails to teach "monitoring the temperature of the pumping mechanism after cessation of operation."

In the Final Office Action of July 16, 2009, Examiner rejects independent claim 6 as being anticipated by Sakagami under 35 U.S.C. 102. Although Examiner acknowledges that Sakagami does not explicitly teach monitoring the temperature of the pumping mechanism after cessation of operation, he asserts that Sakagami must have monitored the temperature in some way, because it teaches to hold the temperature in a certain range during a heating process. *See, the Final Office Action, pages 4-5.* Appellant respectfully disagrees with the assertion.

Sakagami is about heating a pump after its operation starts, rather than monitoring the temperature of the pump when it cools down after the cessation of operation. As shown in FIG. 22 of Sakagami, the stator is heated at step S41 only after the pump starts operating. The pump is heated so that "the solid aluminum chloride can be sublimated to reduce the frictional resistance at the restart of the pump." *See, col. 11, lines 31.* Although Sakagami teaches a step S42 of comparing the stator temperature to a predetermined value, it occurs after step S41, and therefore also after the pump has

already started operation. This differs from the claimed invention where the temperature of the pumping mechanism is monitored after cessation of the pump operation.

Such difference is significant as it enables the claimed invention to do away the heater and heater controller necessary to Sakagami. As shown in FIG. 21 of Sakagami, it requires a heater controller 7, and a heater (no shown) in order to heat the stator after the pump has started. The claimed invention has no need of these heating components. Thus, the claimed invention is advantageous over Sakagami in terms simplicity in pump design and cost-efficiency in pump manufacturing.

2. *Sakagami fails to teach "initiating operation of the pumping mechanism... until a predefined temperature is reached or a predefined time limit has passed."*

Sakagami teaches a method that rocks a magnetically supported shaft in a pump to scrap off particulates clogged between the rotor and stator of the pump. *See, abstract.* As shown in FIG. 10 of Sakagami, after the motor has started, the motor current is compared to a predetermined value to determine if the pump runs properly. If it does not, the motor will stop and start alternately to scrap off the particulates between the rotor and stator. *See, col. 4, lines 19-38.* The rocking motion stops when the motor current falls below the predetermined value. *Id.* Sakagami's teaching about heating the pump merely serves the purpose of softening the particulate clogging. It is not used as an indicator of whether the rocking motion should stop.

The claimed invention uses temperature as a stop-operation indicator. When a pump is switched off, the temperature of the pump provides information of whether the switch-off process is complete. The claimed invention clears particulates when a pump is cooling off and stops when it has cooled off, whereas Sakagami does it after the pump operation has restarted and a current level indicates that the restart has turned successful.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631 (Fed. Cir. 1987).* The invention as described in claim 6 differs from Sakagami at least in that the invention 1) monitors the temperature of the pumping mechanism after cessation of operation, and 2) controls the alternate operations based on temperature or time. As such, claim 6 is not anticipated by Sakagami under 35 USC 102(b).

Claim 16 depends on claim 6 and includes all the limitations recited therein. Accordingly, claim 16 is not anticipated by Sakagami under 35 USC 102(b), either.

B. Rejections to claims 7-14 under 35 USC 103(a) over Sakagami should be withdrawn, because they depend from an allowable, independent claim 6.

As discussed above, independent claim 6 is not anticipated by Sakagami under section 102. Accordingly, claims 7-14 that depend from claim 6 and include all the limitations recited therein are patentable over the cited reference under 25 USC 103(a).

C. Conclusion

Appellant respectfully submits that the Examiner is incorrect in his rejection of the pending claims, and that all the pending claims are drawn to a novel subject matter, patentably distinguishable over the prior art of record. Accordingly, Appellant respectfully requests that the Appeal be granted and the Examiner reversed.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1. (Withdrawn) A dry pump apparatus comprising;

a pumping mechanism,

a controller for controlling the operation of the pumping mechanism, and a sensor for sensing the operating temperature of the pumping mechanism wherein the controller is configured to carry out an automated shutdown sequence involving the following steps;

a) ceasing operation of the pumping mechanism

b) monitoring the temperature of the pumping mechanism by means of the temperature sensor

c) at at least one pre-selected temperature interval, initiating operation of the pumping mechanism for a fixed time period so as to purge a proportion of contaminant particulate matter present until a predefined temperature is reached or a predefined time limit has passed.

2. (Withdrawn) A dry pump apparatus as claimed in claim 1 wherein the controller comprises a microprocessor.

3. (Withdrawn) A dry pump apparatus as claimed in claim 2 wherein the microprocessor is embodied in a computer.

4. (Withdrawn) A dry pump as claimed in claim 3 wherein the computer has installed thereon computer software which causes it to perform the method steps a) to c).

5. (Withdrawn) A dry pump apparatus as claimed in claim 1 wherein the pumping mechanism includes a claw type rotor arrangement.

6. (Original) A method for reducing the incidence of restart failure in a dry pump comprising the steps of;

a) detecting the cessation of operation of the pumping mechanism

b) monitoring the temperature of the pumping mechanism after cessation of operation

c) at at least one pre-selected temperature interval, initiating operation of the pumping mechanism for a fixed time period so as to purge a proportion of contaminant particulate matter present until a predefined temperature is reached or a predefined time limit has passed.

7. (Previously Presented) A method as claimed in claim 6 wherein step c) is performed at preselected temperature intervals corresponding to regular drops in the monitored temperature of the pumping mechanism.

8. (Original) A method as claimed in claim 7 wherein the regular drop interval is 10°C.

9. (Previously Presented) A method as claimed in claim 6 wherein the fixed time period is between 15 and 45 seconds inclusive.

10. (Previously Presented) A method as claimed in claim 6 wherein the fixed time period is the same for each pre-selected temperature interval.

11. (Original) A method as claimed in claim 10 wherein the fixed time period is 30 seconds.

12. (Previously Presented) A method as claimed in claim 6 wherein the fixed time period is different for each pre-selected temperature interval.

13. (Previously Presented) A method as claimed in claim 6 wherein the method is performed for a predefined time limit.

14. (Original) A method as claimed in claim 13 wherein the predefined time limit is 2 hours from cessation of operation.

15. (Previously Presented) A method for reducing the incidence of restart failure in a dry pump comprising the steps of:

a) detecting the cessation of operation of the pumping mechanism;

b) monitoring the temperature of the pumping mechanism after cessation of operation;

c) at at least one pre-selected temperature interval, initiating operation of the pumping mechanism for a fixed time period so as to purge a proportion of contaminant particulate matter present until a predefined temperature is reached or a predefined time

limit has passed wherein at the end of each fixed time period of operation of the pump mechanism a separate inlet purge function is effected by the controller.

16. (Previously Presented) A method as claimed in claim 6 wherein the method is ceased when the first of a predetermined temperature or a predefined time limit has been reached.

17. (Cancelled)

18. (Withdrawn) A computer readable carrier medium which carries instructions adapted to be executed by a processor, the instructions which, when executed, define a series of steps to carry out an automated shutdown sequence of a dry pumping mechanism, comprising:

a) detecting the cessation of operation of the pumping mechanism;

b) monitoring the temperature of the pumping mechanism after cessation of operation; and

c) at at least one pre-selected temperature interval, initiating operation of the pumping mechanism for a fixed time period so as to purge a proportion of contaminant particulate matter present until a predefined temperature is reached or a predefined time limit has passed.

19. (Withdrawn) The computer readable carrier medium as claimed in claim 18 wherein the medium is selected from; a floppy disk, a CD, a mini-disc or digital tape.

20-22. (Cancelled)

23. (Withdrawn) The computer readable carrier medium as claimed in claim 18 wherein at the end of each fixed time period of operation of the pump mechanism, a separate inlet purge function is effected by the controller.

24. (Withdrawn) The computer readable carrier medium as claimed in claim 18 wherein step c) is performed at pre-selected temperature intervals corresponding to regular drops in the monitored temperature of the pumping mechanism.

IX. EVIDENCE APPENDIX

Following referenced is relied upon by the Examiner in rejecting the claims of the present application, and cited in this Appeal Brief.

1. US Patent No. 5,691,291 to Sakagami et al.

X. RELATED PROCEEDINGS APPENDIX

None